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Breen et al.

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(54) **REVERSE DRIVE ASSEMBLY FOR RECLINER POWER MECHANISM**

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Related U.S. Application Data

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(51) **Int. Cl.**

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A47C 1/02	(2006.01)
A47C 1/0355	(2013.01)
A47C 1/035	(2006.01)

(52) **U.S. Cl.**

CPC ***A47C 1/0347*** (2013.01); ***A47C 1/02*** (2013.01); ***A47C 1/0355*** (2013.01); *A47C 1/0352* (2013.01)

(58) **Field of Classification Search**

CPC .. A47C 1/0352; A47C 1/0347; A47C 1/0355; A47C 1/0345; A47C 1/02

USPC ..... 297/85 M, 342, 330, 68

See application file for complete search history.

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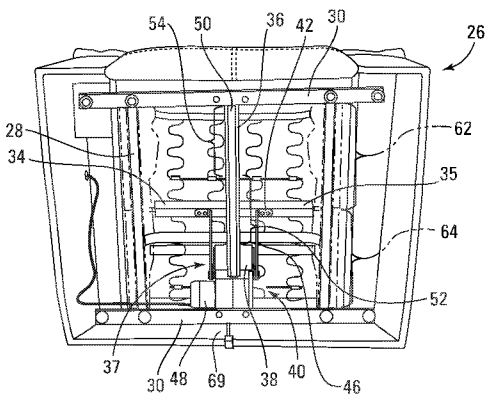
(57) **ABSTRACT**

A reverse drive assembly for recliner in which a motor is mounted at the end of the horizontal track, proximate to the rear of the recliner. A traveler assembly having a reverse transfer linkage having a greater bend is positioned along the track forward of the motor, wherein the traveler assembly actuates extension of an ottoman assembly and the reclining of a seat back.

20 Claims, 9 Drawing Sheets



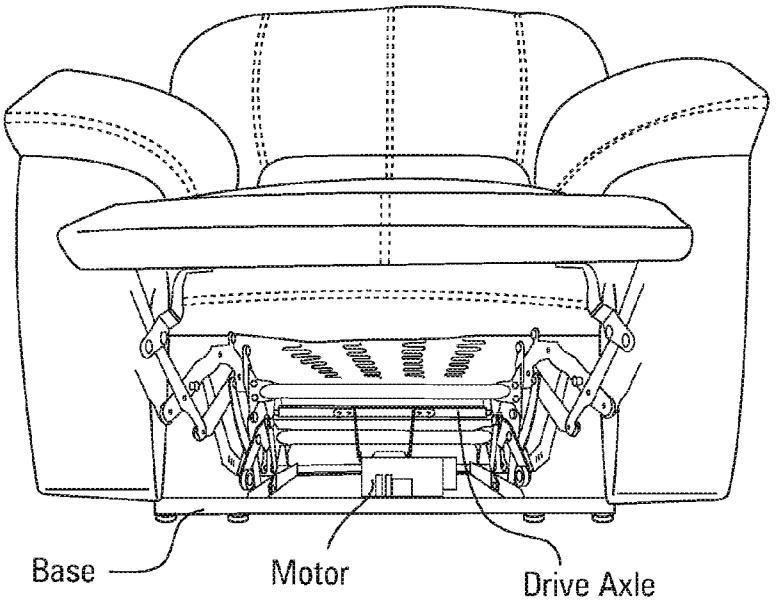


Fig. 1
Prior Art

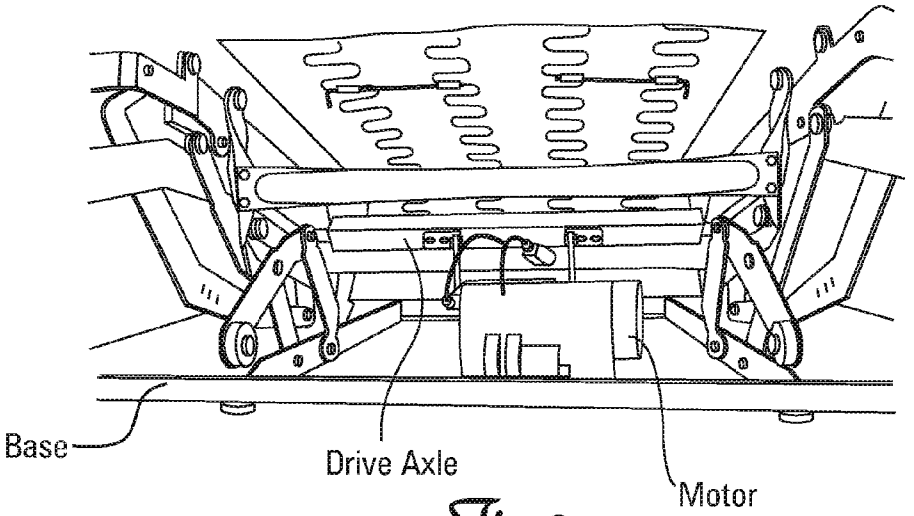


Fig. 2
Prior Art

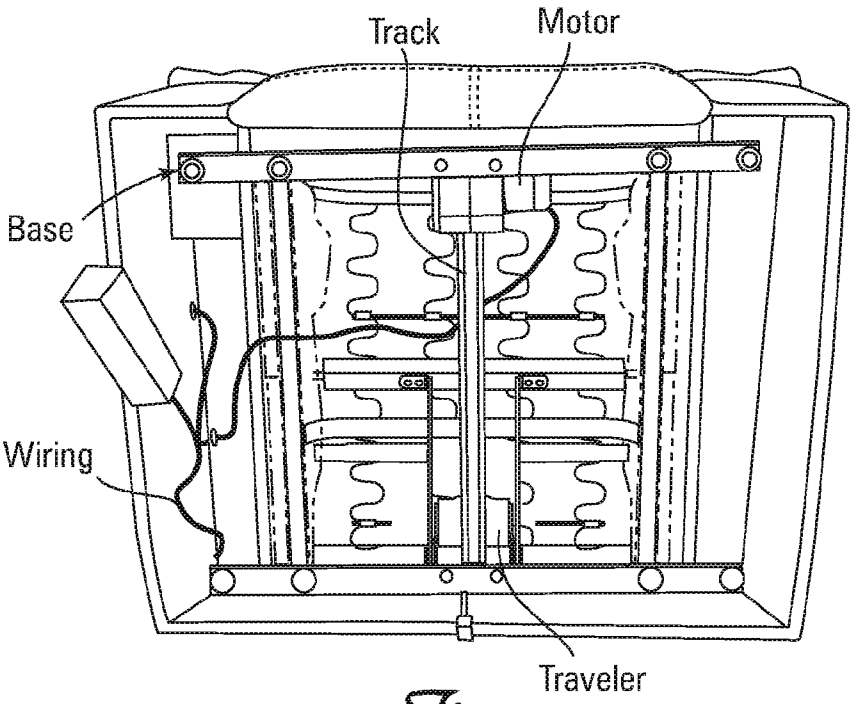


Fig. 3
Prior Art

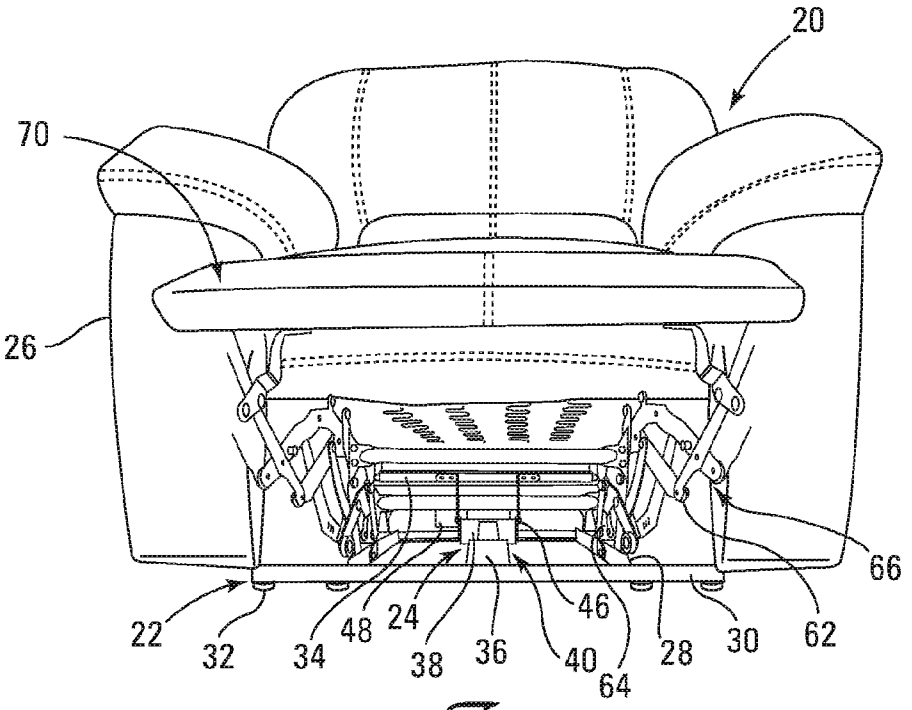

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Fig. 4

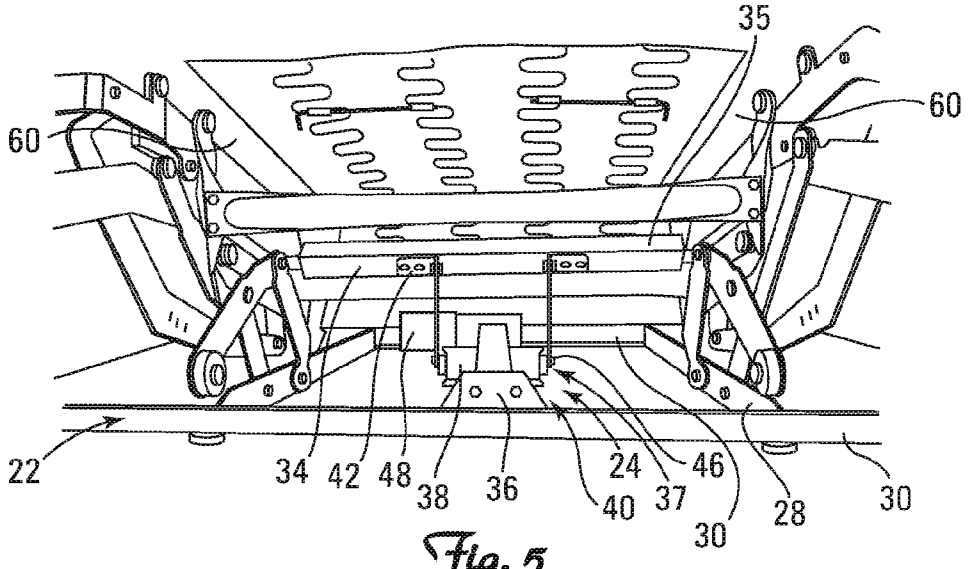
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Fig. 5

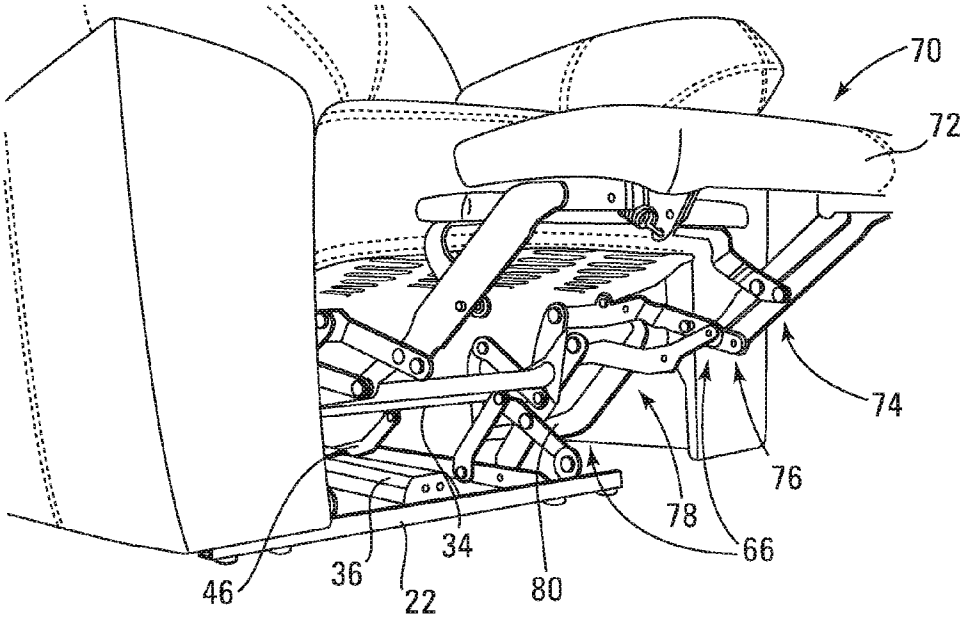

Fig. 6

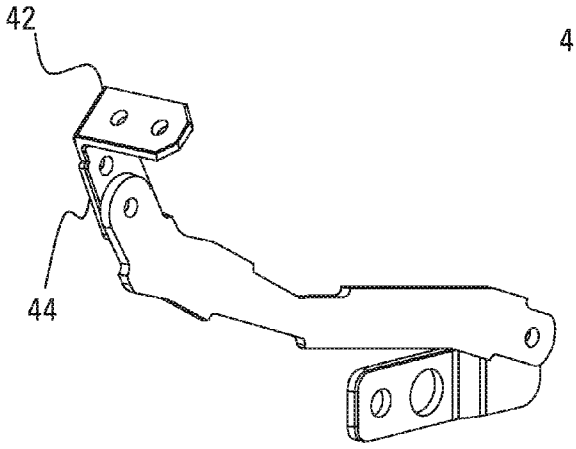

Fig. 7
Prior Art

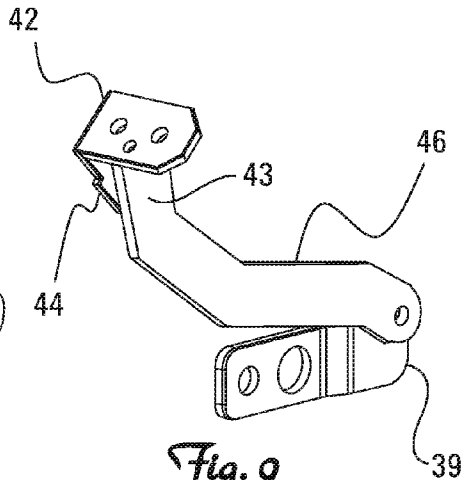

Fig. 9

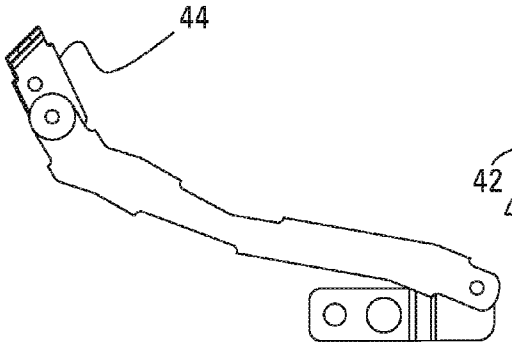

Fig. 8
Prior Art

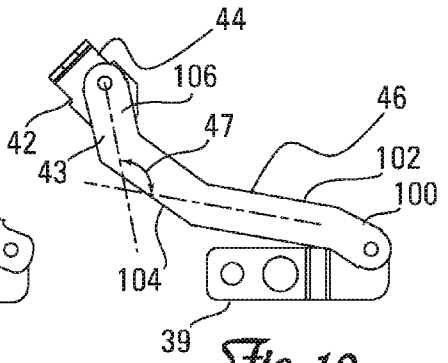

Fig. 10

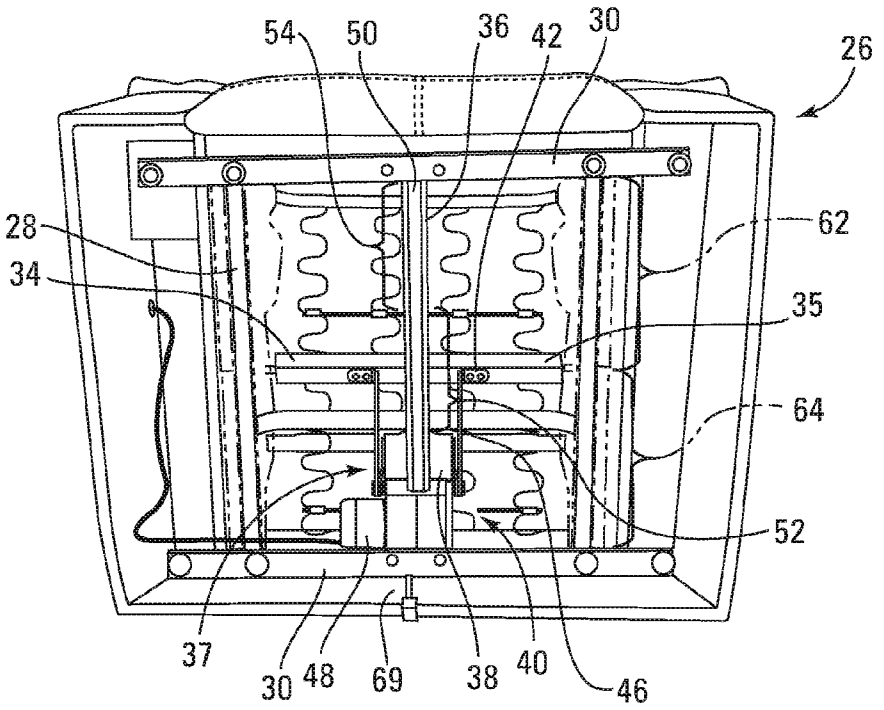

Fig. 11

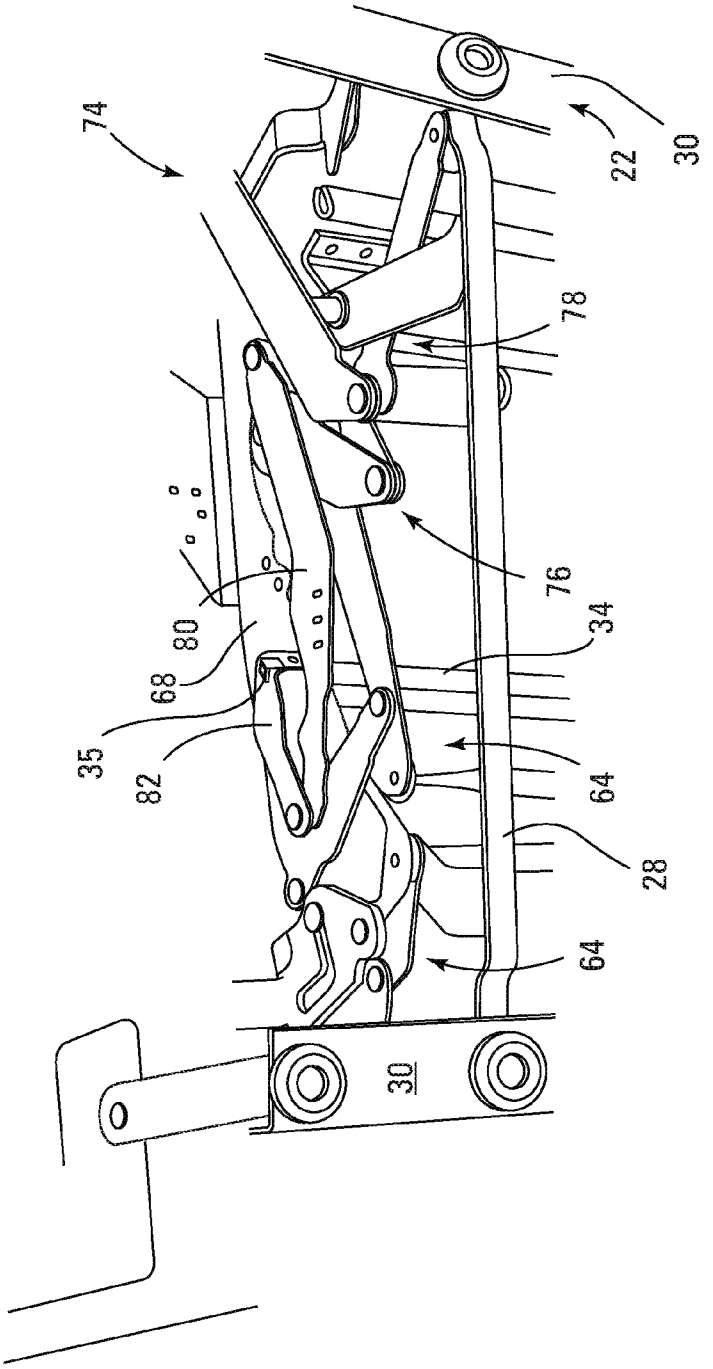

Fig. 12

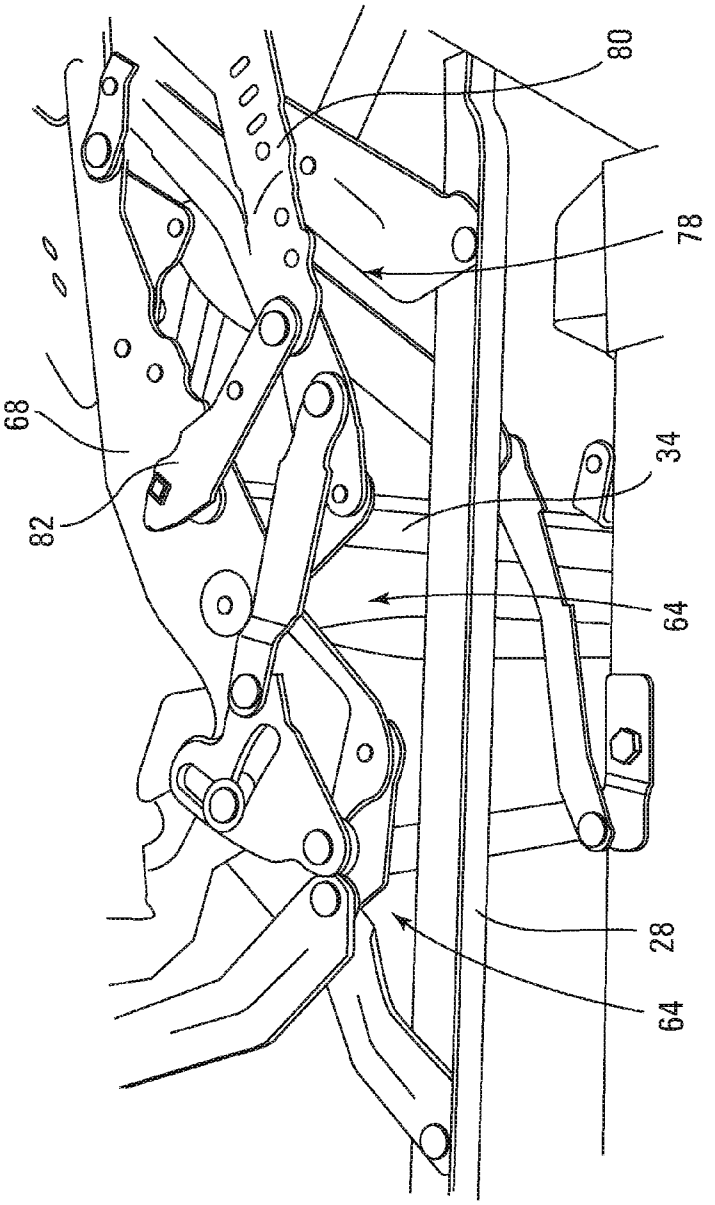

Fig. 13

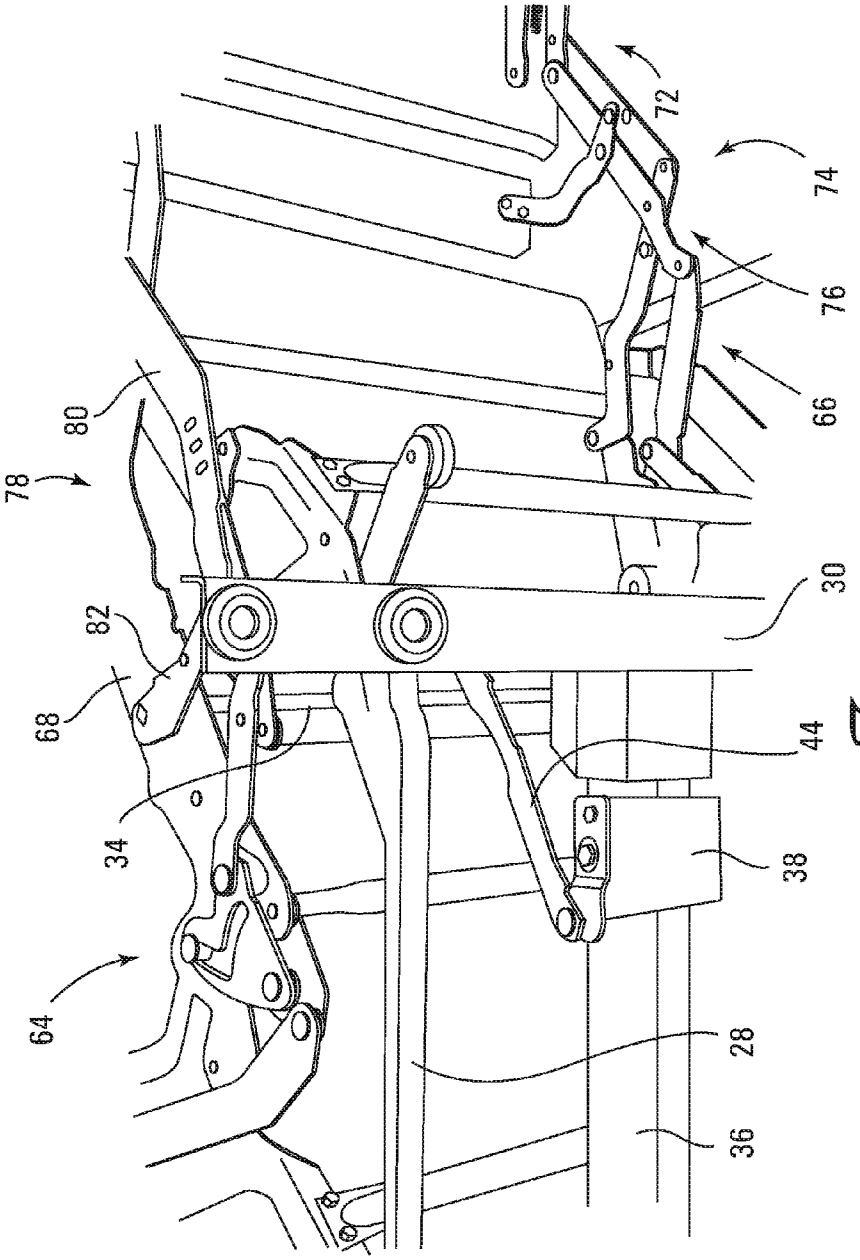

Fig. 14

REVERSE DRIVE ASSEMBLY FOR RECLINER POWER MECHANISM

PRIORITY CLAIM

This application claims priority to U.S. Provisional Application No. 61/708,993, filed Oct. 2, 2012 and U.S. Provisional Application No. 61/802,025, filed Mar. 15, 2013, each of which is hereby fully incorporated herein by reference.

FIELD OF THE INVENTION

The present invention is directed to a power mechanism for driving the movable elements of a recliner. Specifically, the present invention is directed to a power mechanism having a reverse drive assembly with the motor mounted proximate to the rear of the recliner to simplify manufacturing and assembly of the recliner.

BACKGROUND OF THE INVENTION

A recliner typically comprises a back rest that rotates downward to lower the user's back and head from an upright position to more a reclined position. Similarly, recliners also often comprise a deployable ottoman that has a leg rest that rotates outwardly to elevate the user's legs. Certain recliners often also shift the seat box forward to provide room behind the recliner for the lowered back rest. The recliners can also rotate the seat box to elevate the front of the seat box relative to the rear of the seat box to further position the user in a more comfortable reclined position. The back rest, ottoman and seat box of certain recliners are operably linked to a single rotating driving axle that is rotated by a drive assembly to move the various components such that the moving components can be operated simultaneously. The drive axle can also be moved horizontally to provide shift the seat box forward and extend the leg rest outwards from the seat box.

In operation, the drive axle is rotated in a first direction to lower back rest while rotating the leg rest of the ottoman into the reclined position. The drive axle can then be shifted forward to shift the seat box forward and extend the leg rest from the seat box of the recliner. The drive axle can then be shifted backwards and rotated in the opposite direction to return the moving components of the recliner to their original positions.

In certain recliners, such as shown in FIGS. **1-3**, the drive axle is rotated by a traveler moved along a horizontal track perpendicular to drive axle by the drive assembly. The traveler is linked to the drive axle by elongated transfer linkages rotatably affixed to the drive axle via a bracket having an arm extending radially outward from the drive axle. As the traveler moves down the horizontal track, the horizontal motion of the traveler is translated into a pushing or pulling force applied tangential to the drive axle through the arm. The end of the arm and the end of the linkage are rotatably engaged such that the linkage and arm are generally parallel as the traveler initially moves down the horizontal track to apply the tangential force to the drive axle. The tangential force rotates the drive axle until the arm is generally parallel to the horizontal track. Once the arm is generally parallel to the horizontal track, angle between linkage and the arm collapses to apply a force to drive axle generally transverse to the drive axle to move the drive axle horizontally.

The drive assembly often comprises a motor at the end of the horizontal track proximate to the front of the recliner for pulling or pushing the traveler down the track. The front mounted motor is advantageous as the horizontal track is typically positioned beneath the seat box and remains fixed in place even as the various components of the recliner are moving. In particular, shifting the seat box forward to accommodate the reclining back rest can move the edges of the seat box such that the edges of the seat box intersect the horizontal track and motor. A front mounted motor provides more clearance for the motor to avoid the edge of the seat box as the seat box moves forward. Moreover, as the leg rest of the ottoman assembly typically defines the front face of the seat box, the simultaneous extension of the ottoman assembly provides a gap in the front of the seat box to provide additional clearance for the motor. Also, the elevation of the front portion of the seat box also reduces the likelihood that the seat box will become caught on the motor.

While a front mounted motor provides numerous advantages when operation the recliner, the inherent drawback of front mounted motors is that the motor placement is substantially more challenging to manufacture and assemble. A primary design consideration for motor powered recliners is positioning the wiring for the motor such that the power plug extends from the rear of the recliner. The rearward power plug reduces the likelihood that the plug will be tripped over and presents a more aesthetically appealing appearance. However, front mounting the motor requires that the wiring for the motor must be threaded through the plurality of linkages used to operate the moving parts to reach the motor from the rear of the recliner. The wiring must also be secured to prevent the wiring from catching on the linkages during operation of the assembly. The arduous task of threading and securing the wiring adds considerable time to the manufacturing process and can be easily done incorrectly resulting in damage to the wiring or linkages if the linkages engage an improperly secured or threaded wiring.

A similar drawback is that front mounted motors often results in the motor being visible from the front of the recliner through the opening left by the foot rest when the ottoman assembly is deployed. In addition to being aesthetically unpleasing, the exposed motor and/or wiring could become damaged.

As a result, there is a need for a means to operate a recliner that is reduces the time and difficulty required to manufacture the power mechanism for the recliner while maintaining an aesthetically pleasing appearance.

SUMMARY OF THE INVENTION

The present invention is directed to a recliner having a power mechanism comprising a drive axle and a reverse drive assembly in which the motor is mounted at the end of the horizontal track proximate to the rear of the recliner. The reverse drive assembly reduces the effort and time required to assemble and wire the recliner as the motor is positioned proximate to the rear of the recliner minimizing the distance between the power plug and the motor. As such, the wiring linking the motor to the power plug does not have to be threaded through the linkages of the recliner or secured to avoid engaging the linkages. Instead, the wiring can be directly attached to the motor without fear of the wiring being caught on the linkages during operation, thereby substantially reducing the time required to manufacture and assemble the recliner. Also, the rear mounted motor makes the motor less visible when the ottoman assembly is extended. Unlike conventional front mounted motors, the rear mounted motor of the present invention protrudes from the rear of the recliner rather than the front of the recliner when the seat box is shifted forward such that the motor is less visible and less likely to be damaged.

The reverse drive assembly can also further comprise at least one "reverse" transfer linkage bent at a predetermined angle. In operation, the reverse drive assembly must rotate the drive axle a predetermined rotational distance to operate the ottoman assembly and back rest. The reverse transfer linkage is bent further than conventional linkages such that the traveler requires shorter horizontal travel distance to rotate the drive axle the necessary rotational distance. In one aspect, the predetermined angle can comprise a 110 to 150 degree angle. In yet another aspect, the predetermined angle can be bent to comprise a 130 degree angle. The reverse mounted motor allows for a deeper bend in the linkage as the rear mounted motor does not interfere with the transfer linkages as the traveler moves along the horizontal track. In particular, as the traveler approaches the end of the track, the linkage extends over the end of the track potentially impacting a front mounted motor.

Moreover, the shorter horizontal travel distance allows for a shorter horizontal track providing clearance at the rear of the horizontal track for the motor to be rear mounted with sufficient clearance for the seat box. As the drive axle must be moved a predetermined distance horizontally, the length of the horizontal track that must traveled by the traveler to push the drive axle the necessary horizontal distance cannot be shortened. Accordingly, only the length of the horizontal track for rotating the drive axle can be shortened. The bend in the reverse transfer linkage is set to shorten the length of the horizontal track corresponding to rotation of the drive axle such that the motor can be placed behind the traveler.

A power mechanism, according to an embodiment of the present invention, can comprise a drive axle, a reverse drive assembly, a horizontal track and a traveler. The reverse drive assembly can further comprise a motor and a worm gear positionable within the horizontal track and rotatable by the motor to move the traveler along the horizontal track. The motor is affixed to one end of the horizontal track, wherein the horizontal track is positioned perpendicular to a rotatable drive axle for a recliner such that the motor is positioned proximate to the rear of the recliner. The traveler can further comprise at least one reverse transition linkage having an L-shaped bracket at one end of the linkage for rotatably engaging the linkage to the drive axle.

In one aspect, the horizontal track can define a first segment corresponding to the length of the horizontal track that is traveled by the traveler to rotate drive axle a predetermined rotational distance and define a second segment corresponding to the length of the horizontal track traveled by the traveler to move the drive axle a predetermined horizontal distance. The predetermined rotational distance corresponds to the necessary rotation for the drive axle to extend the ottoman assembly and/or recline the back rest. The predetermined horizontal distance corresponds to the horizontal distance the seat box is shifted forward to provide clearance for the reclining back rest. In this configuration, each reverse transfer linkage is bent at a predetermined angle to shorten the first segment of the horizontal track enough to provide at least enough clearance at the rear of the horizontal track to mount the motor at the rear of the horizontal track while still rotating the drive axle the necessary rotational distance.

A recliner, according to an embodiment of the present invention, comprises a seat box, a back rest, an ottoman assembly, a base and a power mechanism. The power mechanism comprises a drive axle rotated and moved horizontally by a traveler traveling along a horizontal track. The drive axle is rotatably mounted to the seat box, wherein moving the drive axle horizontally with the traveler shifts the seat box horizontally with the drive axle. In one aspect, the seat box can further comprise a notch in the rear edge of the seat box to provide clearance for the rear-mounted motor as the seat box slides forward. Similarly, the ottoman assembly further comprises a leg rest and at least one scissor linkage assembly having a lever linkage engaged to the drive axle such that rotating the drive axle extends the scissor linkage assembly to position the leg rest generally parallel to the top of the seat rest.

The above summary of the various representative aspects of the invention is not intended to describe each illustrated aspect or every implementation of the invention. Rather, the aspects are chosen and described so that others skilled in the art can appreciate and understand the principles and practices of the invention. The figures in the detailed description that follow more particularly exemplify these aspects.

Still other objects and advantages of the present invention and methods of construction of the same will become readily apparent to those skilled in the art from the following detailed description, wherein only the preferred embodiments are shown and described, simply by way of illustration of the best mode contemplated of carrying out the invention. As will be realized, the invention is capable of other and different embodiments and methods of construction, and its several details are capable of modification in various obvious respects, all without departing from the invention. Accordingly, the drawing and description are to be regarded as illustrative in nature, and not as restrictive.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention can be completely understood in consideration of the following detailed description of various embodiments of the invention in connection with the accompanying drawings, in which:

FIG. **1** is a front view of a conventional recliner having a drive assembly with a front mounted motor.

FIG. **2** is a partial front view of the drive assembly of the conventional recliner depicted in FIG. **1**.

FIG. **3** is a bottom view of the conventional recliner depicted in FIG. **1**.

FIG. **4** is a front view of a conventional recliner having a drive assembly according to an embodiment of the invention.

FIG. **5** is a partial front view of the drive assembly of the recliner depicted in FIG. **4**.

FIG. **6** is a partial front perspective view of recliner depicted in FIG. **4**.

FIG. **7** is a perspective view of a conventional transfer linkage used with a front mounted motor.

FIG. **8** is a side view of the conventional transfer linkage depicted in FIG. **7**.

FIG. **9** is a perspective view of a reverse transfer linkage used with a rear mounted motor according to an embodiment of the present invention.

FIG. **10** is a side view of the reverse transfer linkage depicted in FIG. **9**.

FIG. **11** is a bottom view of the recliner depicted in FIG. **4**.

FIG. **12** is a partial side perspective view of the swing linkages of the recliner when the ottoman assembly is in its closed position.

FIG. **13** is a partial side perspective view of the swing linkages of the recliner when the ottoman assembly is in its extended position.

FIG. **14** is a partial side perspective view of the swing linkages of the recliner when the ottoman assembly is in its extended position and the seat back is reclined.

While the invention is amenable to various modifications and alternative forms, specifics thereof have been shown by

way of example in the drawings and will be described in detail. It should be understood, however, that the intention is not to limit the invention to the particular embodiments described. On the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

DETAILED DESCRIPTION OF THE DRAWINGS

As shown in FIGS. **4-6**, a recliner **20**, according to an embodiment of the present invention, comprises a base **22**, a power mechanism **24** and a seat box **26**. The base **22** further comprises at least two longitudinal rails **28** each intersected with at least two end rails **30** to define a generally rectangular frame for supporting the recliner **20**. The base **22** is adapted to be positioned on the ground beneath the recliner **20** and support the recliner **20** during the operation of the recliner **20**. In one aspect, the base **22** can further comprise at least one positioning wheel **32** for changing the orientation of the recliner **20**.

As shown in FIG. **11**, the power mechanism **24** further comprises a drive axle **34**, a horizontal track **36**, a traveler assembly **37** and a reverse drive assembly **40**. The drive axle **34** can further comprise a crossbar **35**, which is preferably square in cross-section, and a bracket **42**, as seen in FIGS. **9** and **10**, having an arm portion **44**. The bracket **42** is operably mounted to the crossbar **35**, such that the arm portion **44** extends radially outward from the crossbar **35**. Applying a pushing or pulling force to the arm portion **44** tangentially causes the drive axle **34** to rotate. The traveler assembly **37** comprises a traveler **38** and at least one reverse transfer linkage **46** rotatably affixed to the traveler **38** via a bracket link **39** at one end and rotatably affixed to the arm portion **44** at point **43** at the opposite end.

As shown in FIGS. **9-10**, each transfer linkage **46** is bent at a predetermined angle. In an embodiment of the transfer linkage **46**, the transfer linkage **46** comprises substantially straight segments, including a proximal end segment **100**, which is rotatably affixed to the bracket link **39**, a primary segment **102**, a secondary segment **104**, and a distal end segment **106** rotatably affixed to the arm portion **44**. In one aspect, the predetermined angle **47** of the transfer linkage **46** between the segments **102** and **106** is about 110 degrees, whereas a conventional transfer linkage is typically linear or nearly linear as shown in FIGS. **7-8**. In some aspects of the invention, the angle **47** may be within the range of about 110 to 130 degrees. The reverse drive assembly **40** can further comprise a motor **48** and a worm gear **50** positioned within the horizontal track **36**. The horizontal track **36** is mounted to the end rails **30** such that the horizontal track **36** extends between the end rails **30** in parallel to the longitudinal rails **28**. The motor **48** is positioned at the end of the horizontal track **36** proximate to the rear of the seat box **26**. In one aspect, the horizontal track **36** defines a first segment **52** and a second segment **54**.

In operation, the traveler **38** is operably engaged to the worm gear **50**, such that rotation of the worm gear **50** by the motor **48** in a first direction pushes the traveler **38** down the horizontal track **36** in the first direction, toward the front of the recliner **20**. Rotating the worm gear **50** in the opposite second direction pulls the traveler **38** in the opposite direction. Moving the traveler **38** in the first direction through the first segment **52** applies a tangential pushing force to the arm portion **44** to rotate the drive axle **34** in a first direction until the drive axle **34** has rotated a predetermined rotational distance. The drive axle **34** remains substantially longitudinally fixed relative to the traveler **38** during longitudinal movement of the traveler **38**. The length of the first segment **52** corresponds to the necessary horizontal travel distance of the traveler **38** to rotate the drive axle **34** the necessary rotational distance. This distance substantially effectuates to the extension of the ottoman assembly **70**. Continuing the movement of the traveler **38** into the second segment **54** maintains the rotation of the drive axle **34**, in that the drive axle **34** substantially ceases rotation, while applying an axial pull force to the arm portion **44** to move the drive axle **34** horizontally with the traveler **38**. Similarly, moving the traveler **38** in the second direction through the second segment **54** moves or pushes the drive axle **34** horizontally in the opposite direction until the traveler **38** reaches the first segment **52**. Pulling the traveler **38** in the second direction through the first segment **52** applies a tangential pulling force to the arm portion **44** to rotate the drive axle **34** in an opposite second direction until the drive axle **34** is returned to the original position.

The seat box **26** further comprises a box frame **60**, at least two forward swing linkage assemblies **62** and at least two rear swing linkages **64**. Each forward swing linkage assembly **62** comprises scissoring linkages **66** movable between a generally bent orientation and a generally elongated orientation. The seat box **26** also further comprises at least one drive axle bracket **68** for rotatably receiving the drive axle **34**. In the embodiment shown, the drive axle bracket further serves as the seat mounting plate. As shown in FIG. **6**, the two forward swing linkage assemblies **62** are each rotatably affixed at one end to the box frame **60** proximate to the front of the seat box **26** and rotatable affixed to the corresponding longitudinal rail **28** at the opposite end proximate to the front of the base **22**. Similarly, the two rear swing linkages **64** are rotatable affixed at one end to the box frame **60** proximate to the rear of the seat box **26** and rotatable affixed to the corresponding longitudinal rail **28** at the opposite end proximate to the rear of the base **22**.

In operation, moving the traveler **38** in the first direction through the second segment **54** moves the seat box **26** forward relative to the base **22**. As shown in FIG. **6**, moving the seat box **26** forward relative to the base **22** extends the scissoring linkages **66** of the forward swing assemblies **62** to elevate front of the seat box **26** as the seat box **26** moves forward. Similarly, moving the traveler **38** in the second direction through the second segment **54** moves the seat box **26** backwards relative to the base **22** and folds the scissoring linkages **66** to return the seat box **26** to the original orientation. In one aspect, the seat box **26** can further define a notch or opening **69** in the rear of the seat box **26** such that the edge of the seat box **26** does not engage the motor **48** as the seat box **26** is moved forward with the lowered rear end.

As shown in FIGS. **4-6**, the recliner **20** further comprises an ottoman assembly **70** integrated into the seat box **26**. The ottoman assembly **70** comprises a leg rest **72**, an extension assembly **74** having a plurality of scissoring linkages **76**, and a lever assembly **78**. The scissoring linkages **76** of the extension assembly **74** are adapted to rotate the leg rest **72** such that the leg rest **72** is generally parallel to the top of the seat box **26**. The lever assembly **78** further comprises a transfer linkage **80** and a lever linkage **82**. The lever linkage **82** is operably engaged to drive axle **34** such that rotating the drive axle **34** rotates the lever linkage **82**. The transfer linkage **80** is operably engaged to the lever linkage **82** and extends between the lever linkage **82** and the leg rest **72** to transfer the rotation of the drive axle **34** to a corresponding movement in the leg rest **72** via the extension assembly **74**. In one aspect, the leg rest **72** defines the front the seat box **26**.

In operation, moving the traveler **38** through the first segment **52** in the first direction rotates the drive axle **34** in the first direction applying a pushing force on the leg rest **72**

through the lever assembly **78** to extend the extension assembly **74** and position the leg rest **72** in an orientation generally parallel to the top of the seat box **26**. Similarly, moving the traveler **38** in the second direction through the first segment **52** rotates the drive axle **34** in the second direction applying a pulling force on the leg rest **72** through the lever assembly **78** to retract the extension assembly **74** to return the leg reset **72** to the original position. In one aspect, the ottoman assembly **74** can be mounted to the seat box **26** on a floating assembly such that the horizontal movement of the drive axle **34** extends the leg rest **72** out from the seat box **26**.

FIGS. **12-14** are partial side perspective views of the swing linkages of the recliner when the ottoman assembly is in its closed position, extended position and extended position with the seat back is reclined, respectively. From the closed position to the extended position, the traveler assembly moves through the first segment of the track. As the traveler assembly goes through the second segment, the seat back is reclined.

While the invention is amenable to various modifications and alternative forms, specifics thereof have been shown by way of example in the drawings and described in detail. It is understood, however, that the intention is not to limit the invention to the particular embodiments described. On the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the spirit and scope of the invention as defined by the appended claims.

REFERENCES

U.S. Pat. No. 8,297,693	U.S. Pat. No. 7,673,933	U.S. Pat. No. 4,386,803
U.S. Pat. No. 4,365,836	U.S. Pat. No. 4,696,512	U.S. Pat. No. 6,612,650
US Pub 3499344	U.S. Pat. No. 4,929,024	U.S. Pat. No. 4,691,964

The above references in all sections of this application are herein incorporated by references in their entirety for all purposes. For purposes of interpreting the claims for the present invention, it is expressly intended that the provisions of Section 112, sixth paragraph of 35 U.S.C. are not to be invoked unless the specific terms "means for" or "step for" are recited in a claim

All of the features disclosed in this specification (including the references incorporated by reference, including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including references incorporated by reference, any accompanying claims, abstract and drawings) may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any incorporated by reference references, any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed The above references in all sections of this application are herein incorporated by references in their entirety for all purposes.

Although specific examples have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that any arrangement calculated to achieve the same purpose could be substituted for the specific examples shown. This application is intended to cover adaptations or variations of the present subject matter. Therefore, it is intended that the invention be defined by the attached claims and their legal equivalents, as well as the following illustrative aspects. The above described aspects embodiments of the invention are merely descriptive of its principles and are not to be considered limiting. Further modifications of the invention herein disclosed will occur to those skilled in the respective arts and all such modifications are deemed to be within the scope of the invention.

The invention claimed is:

1. A recliner, comprising:

a seat box having a front and a back;

a base defining a frame positioned under the seat box, the frame having a front portion and a back portion; and

a power mechanism for powering a change in orientation of the recliner, wherein the power mechanism comprises

a track having an axis, a first end and a second end, wherein the axis of the track runs from the front portion to the back portion of the frame and the first end is fixed to the hack portion and the second end is fixed to the front portion;

a traveler being movable along the track; and

a drive assembly, the drive assembly comprising a motor, wherein the motor is positioned adjacent to the back portion, such that the traveler is positioned between the motor and the front portion, relative to the axis of the track,

wherein the motor drives the traveler to effectuate the change in orientation of the recliner.

2. The recliner of claim **1**, the base defining a generally rectangular frame comprising two longitudinal rails running parallel with the track and a front rail and a back rail, each intersecting with the two longitudinal rails, wherein the first end of the track is secured to the back rail and the second end is secured to the front rail.

3. The recliner of claim **1**, further comprising a drive axle oriented substantially perpendicular with the track axis and the power mechanism further comprising a transfer linkage, wherein a first end of the transfer linkage is rotatably affixed to the traveler and a second end is rotatably affixed to the drive axle and wherein movement of the traveler along a portion of the track applies a force on the drive axle effectuating a rotation of the drive axle, which in turn effectuates a change in orientation of the recliner.

4. The recliner of claim **3**, wherein the drive assembly further comprises a worm gear positioned within the track, wherein the worm gear moves the traveler.

5. The recliner of claim **3**, wherein, in operation, the traveler is operably engaged to a worm gear, such that rotation of the worm gear by the motor in a first direction pushes the traveler in a first track direction, while rotating the worm gear in a second direction opposite the first direction pulls the traveler in a second track direction, wherein moving the traveler from a first position in the first track direction through the a first segment applies a tangential pushing force to the crossbar to rotate the drive axle in a first rotating direction until the drive axle has rotated a predetermined rotational distance, the length of the first segment corresponding to a travel distance of the traveler along the track necessary to rotate the drive axle the predetermined rotational distance, and continuing movement of the traveler into a second segment maintains the rotation of the drive axle while applying an axial pull force to

the crossbar to move the drive axle horizontally with the traveler, and wherein moving traveler in a second track direction through the second segment moves the drive axle horizontally in the second track direction until the traveler reaches the first segment, wherein pulling the traveler in the second track direction through the first segment applies a tangential pulling force to the crossbar to rotate the drive axle in a second rotating direction until the drive axle is returned to the first position.

6. The recliner of claim **3**, the seat box further comprising a box frame, two forward swing linkage assemblies and two rear swing linkages, each forward swing linkage assembly comprising scissoring linkages movable between a generally bent orientation and a generally elongated orientation, and wherein the seat box further comprises at least one drive axle bracket for rotatably receiving the drive axle, wherein the two forward swing linkage assemblies are each operably rotatably affixed at a first end to the box frame proximate to the front of the seat box and rotatably affixed to a corresponding longitudinal rail of the base at a second end proximate to the front portion of the base.

7. The recliner of claim **3**, the recliner further comprising an ottoman assembly integrated into the seat box, wherein the ottoman assembly comprises a leg rest, an extension assembly having a plurality of scissoring linkages, and a lever assembly, the traveler actuating the ottoman assembly upon movement along the track.

8. The recliner of claim **3**, wherein the power mechanism comprises two transfer linkages rotatably affixed to the traveler and rotatably affixed to the drive axle.

9. The recliner of claim **8**, wherein the transfer linkages are bent at a predetermined angle and the predetermined angle is a 110 to 130 degree angle.

10. The recliner of claim **3**, wherein the transfer linkage is bent at a predetermined angle.

11. The recliner of claim **10**, wherein the predetermined angle for the transfer linkage is a 110 to 130 degree angle.

12. The recliner of claim **10**, wherein the predetermined angle for the transfer linkage is about 110 degrees.

13. The recliner of claim **3**, the drive axle comprising a crossbar oriented transverse to the track and a bracket having an arm portion, wherein the bracket is fixedly mounted to the crossbar and the arm portion extends radially outward from the crossbar, such that applying a pushing or pulling force to the arm portion tangentially to the crossbar rotates the drive axle.

14. The recliner of claim **13**, wherein the track defines a first segment and a second segment, in effectuating the change in orientation of the recliner, the traveler moves along the track from a position adjacent to the motor, through the first segment and then the second segment to the front portion, wherein, when the traveler moves in the first segment, the drive axle rotates and the crossbar remains substantially longitudinally fixed relative to the traveler, and, when the traveler moves in the second segment, the crossbar moves longitudinally with the traveler.

15. The recliner of claim **14**, the movement of the traveler in the first segment effectuates extension of a leg rest and the movement of the traveler in the second segment effectuates reclining of a back rest.

16. A recliner having a front portion and a back portion, comprising

a power mechanism for powering a change in orientation of the recliner, wherein the power mechanism comprises

a track having an axis, a first end and a second end, wherein the axis of the track runs from the front portion to the back portion of the recliner and the first end is fixed to the back portion and the second end is fixed to the front portion;

a traveler being movable along the track; and

a drive assembly, the drive assembly comprising a motor, wherein the motor is positioned adjacent to the back portion, such that the traveler is positioned between the motor and the front portion, relative to the axis of the track,

wherein the motor drives the traveler to effectuate the change in orientation of the recliner.

17. The recliner of claim **16**, further comprising a drive axle oriented substantially perpendicular with the track axis and the power mechanism further comprising a transfer linkage, wherein a first end of the transfer linkage is rotatably affixed to the traveler and a second end is rotatably affixed to the drive axle and wherein movement of the traveler along a portion of the track applies a force on the drive axle effectuating a rotation of the drive axle, which in turn effectuates a change in orientation of the recliner.

18. The recliner of claim **17**, the drive axle comprising a crossbar oriented transverse to the track and a bracket having an arm portion, wherein the bracket is fixedly mounted to the crossbar and the arm portion extends radially outward from the crossbar, such that applying a pushing or pulling force to the arm portion tangentially to the crossbar rotates the drive axle.

19. The recliner of claim **17**, wherein the transfer linkage is bent at a predetermined angle, wherein the predetermined angle for the transfer linkage is a 110 to 130 degree angle.

20. The recliner of claim **19**, wherein the predetermined angle for the transfer linkage is about 110 degrees.

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